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ABSTRACT

A study was conducted to demonstrate that direct measurement of behavior change in pupils can be used to evaluate teaching effectiveness. The measurement techniques used in the evaluation process were derived from operant conditioning. Effectiveness was judged in terms of the attainment by the pupils of teacher-specified objectives. The availability of a pupil behavior change measure for evaluating teaching effectiveness was illustrated in the context of an adjunct teacher training program. First, the teaching effectiveness of the instructors in the seminar portion of the adjunct program was assessed by measuring behavior change in the student teachers enrolled. Several of the student teachers were then evaluated in a similar manner during their student teaching experiences by measuring behavior change in their deaf pupils. The data concerning changes in student teaching behavior during the instructional phase of the adjunct teaching program clearly demonstrate the ineffectiveness of the teaching procedures. Although the teaching procedures used were not effective, the use of the behavior change measure was well illustrated. (Included in the document is a detailed description, along with related graphs, of the data from a single student.) (JA)

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# The Use of Behavior Change in Pupils as a Criterion for Evaluating Teaching Effectiveness

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The evaluation of teaching effectiveness is often neglected at the college level and subjectively done through observation by supervisors at the public school level. Teaching effectiveness is seldom evaluated objectively and rarely evaluated in terms of behavior change in pupils. This situation exists despite the educational viewpoint that pupil behavior change is the ultimate criterion of teaching effectiveness (Ackerman, 1954; Gage, 1963).

There are numerous studies (Bradley, 1964, Saadeh, 1970) that evaluate teaching effectiveness but few of these concern teachers of the deaf. Rotter (1962) reports that he reviewed the literature from 1917-1959 and found a lack of evaluative studies of teacher education programs that train teachers of the deaf. With the exception of Brill (1952) a search of the literature confirmed Rotter's (1962) statement about the lack of studies that evaluate teacher education programs for teachers of the deaf. There were no studies listed under "Teacher Training" in the Bibliography on Deafness (Fellendorf, 1966) that used a research design to evaluate the teacher-training programs or teaching effectiveness.

Recent studies (Hall, Fox, Willard, Goldsmith, Emerson, Owen, Davis, and Porcia, 1971; McKenzie, Egner, Knight, Perelman, Schneider, and Garvin, 1970) have demonstrated that behavior change in pupils is an available method for

evaluating teaching effectiveness. The teaching effectiveness of students trained in special college programs was shown in these studies by giving examples of the student's successful attempts in modifying pupil behavior. Other studies (Ferster, 1968; Lloyd, 1971) have demonstrated the effectiveness of college level teaching by reporting changes in student's behavior. For example, Ferster (1968) reported alterations in the frequencies of completed interviews by students on textbook units as a result of instructional procedures.

The behavior change approach to the evaluation of teaching effectiveness was used during the 1970-1971 academic year in an adjunct program at the Department of Special Education, Teachers College, Columbia University. First, the teaching effectiveness of the instructors in the seminar portion of the adjunct program was assessed by measuring behavior change in the student-teachers enrolled. Several of the student-teachers were then evaluated in a similar manner during their student-teaching experiences by measuring behavior change in their deaf pupils.

The data concerning student-teaching behavior change during the instructional phase of the adjunct training program clearly demonstrate the ineffectiveness of the teaching

procedures used. Although the teaching procedures used were not effective, the use of the behavior change measure was well illustrated. Individual data was recorded for the 22 student-teachers in the program. The data from a single student is given below.

Results for Single Subject N. J.:

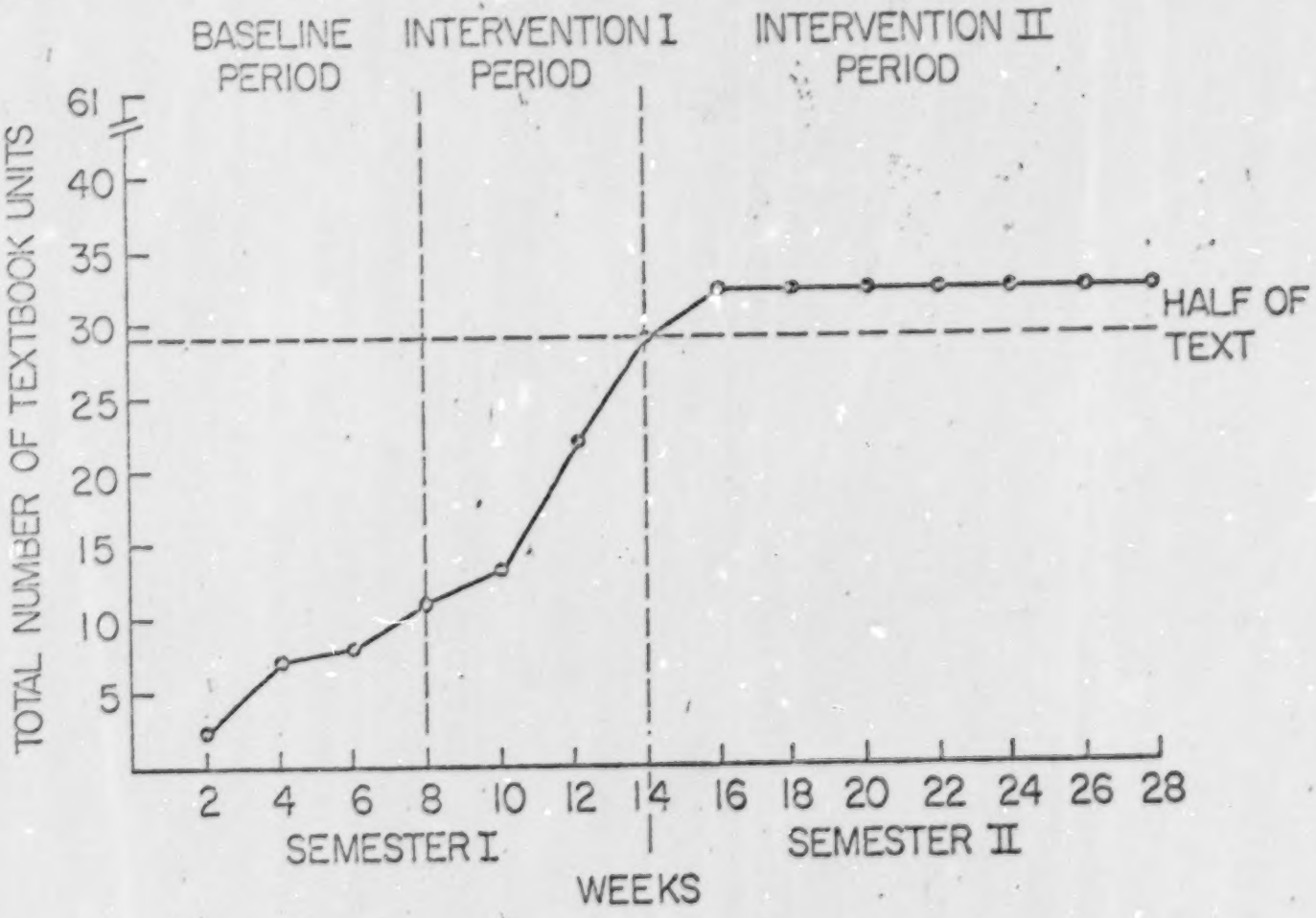
1. Final behavior: Verbal Fluency was to be demonstrated by the completion of interviews on all of the 61 units of Ferster and Perrott (1968) by the end of the second semester.

a. Definition of Relevant Behavior: An interview was completed after the speaker had vocalized with or without notes, the main points of a textbook unit within a ten-minute period. Both the speaker and listener had to agree that verbal mastery of the unit was demonstrated.

b. Measurement Procedures: A continuous record of the textbook unit completion rate was kept.

2. Baseline Data: The Baseline Period shown in Figure 1 had a mean rate of textbook unit completion of 1.37 units per week for subject N. J. If this rate continued for the remainder of the first semester, much less

FIGURE 1 CUMULATIVE RECORD OF COMPLETED INTERVIEWS FOR N.J.



than the required 29 units (half of the textbook) would be completed at the end of the first semester. Due to the slow rate of completed textbook units, the decision was made to change the teaching procedures. This involved the statement by the instructor to the student that 29 units of the text must be completed before the end of the first semester in order to receive a pass for that semester. This change in teaching procedures is referred to as Intervention I.

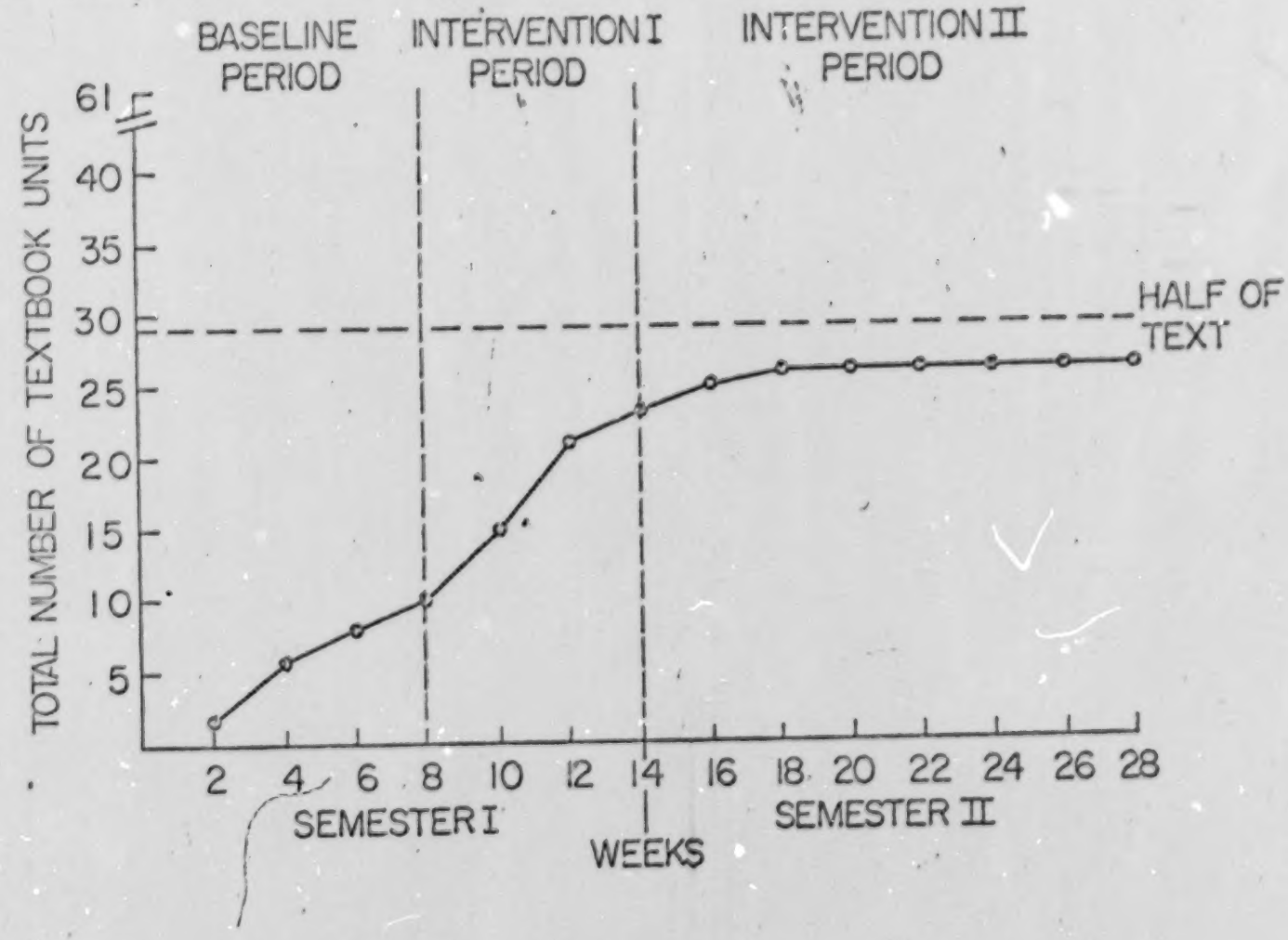
3. Intervention Data: Continuous data were recorded after Intervention I was instituted. Figure 1 shows that the teaching objective of having the student complete 29 units by the end of the first semester was achieved.

At the beginning of the second semester, a performance contract was drawn up that specified a minimum rate of textbook units to be completed per month. The student, N. J., had a minimum rate of 7 units per month. The Intervention II Period in Figure 1 indicates that the change in teaching procedures (i.e. the performance contract) was not effective in achieving the objective of textbook completion.

Group Results:

The group results were similar to N. J.'s data. Figure 2 shows the mean cumulative record of completed interviews for the student-teachers during the first and second semesters.

FIGURE 2 CUMULATIVE RECORD OF COMPLETED INTERVIEWS FOR GROUP



Intervention I resulted in a sharp increase of completed interviews but the group did not attain the first semester goal of 29 completed units. Intervention II did not result in the desired effect, completion of the text. In fact Intervention II Period interview rates were considerably lower than Baseline Period rates for the group.

The group data available at the end of the first semester indicated to the instructors the adjunct program that most of the student-teachers had completed half of the text. This was assumed by the instructors to be the minimum amount of information needed by the student-teachers in order that they be able to carry out their own behavior modification studies. They were encouraged to do so during their student-teaching experiences. Teaching effectiveness was defined as the successful alteration of their pupils' behavior in desired directions. The pupils were enrolled in schools for the deaf. Six studies were completed during student-teaching. An example of one study is given below.

Study #1 by C. J.

1. Final Behavior: Children were to remain lying down during rest period. (N=6)

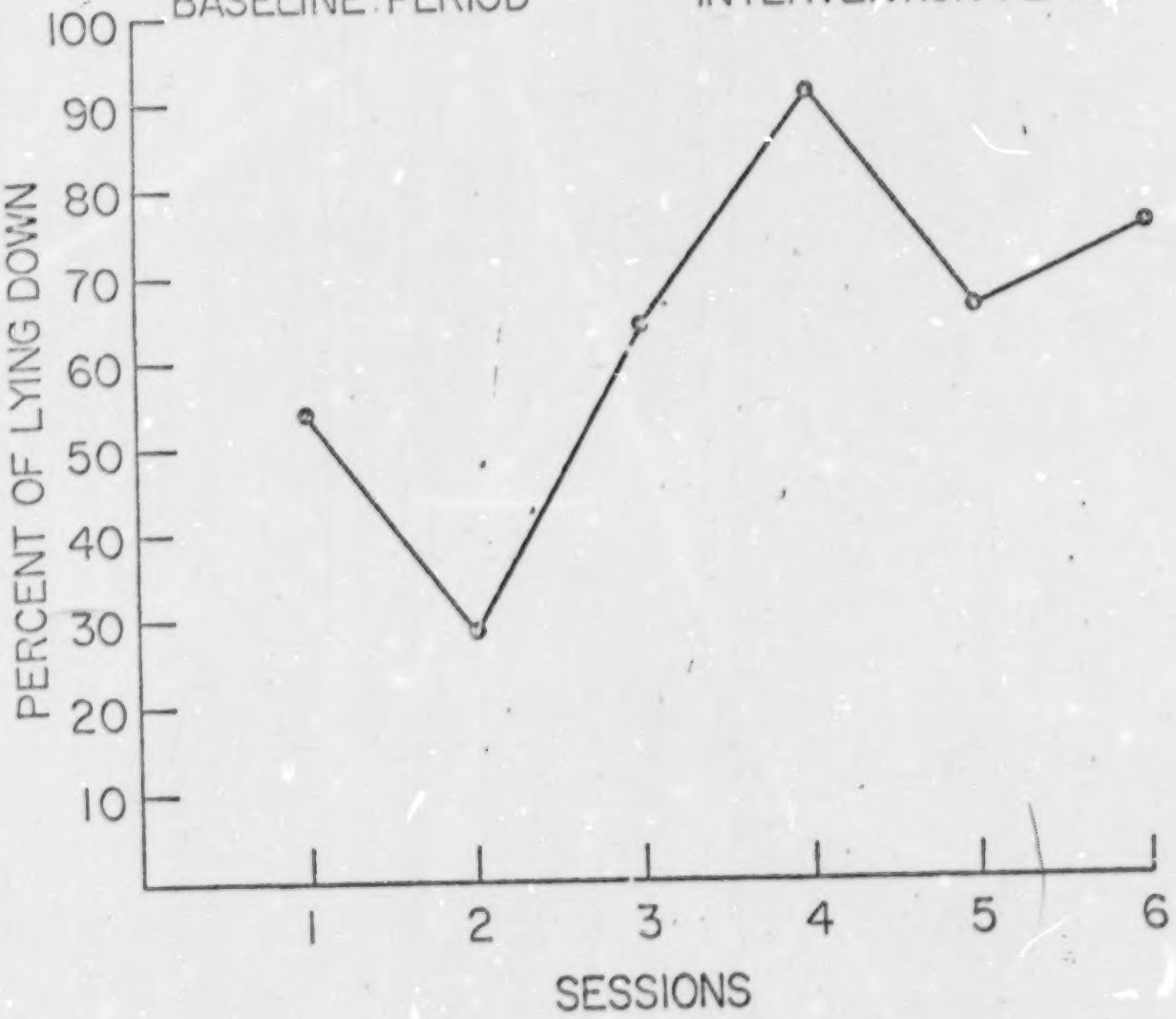
a. Definition of Relevant Behavior: Lying down was defined as remaining supine without talking or rolling around.

b. Measurement Procedures: A continuous record was kept of the per cent of pupils who were lying down during each rest period. Responses were recorded at the end of every minute for each child if they were lying down at that moment.

2. Baseline Data: The Baseline Period shown in Figure 3 confirmed the student-teachers' observation that most of the children were not resting. The 54% of lying down behavior recorded during session 1 was unusually high and thought to be caused by the presence of a reliability checker in the classroom. The student-teacher decided to attempt to reinforce lying down by giving tokens contingent upon lying down on a VI 3 schedule to the pupils. The tokens were exchangeable for an equal number of raisins after each rest period.

3. Intervention Data: The rate of lying down immediately rose after the tokens were used. The Intervention Period shown in Figure 3 demonstrates the effect of the change in teaching procedures. The teaching objective was considered to be achieved by the student-teacher.

FIGURE 3 LYING DOWN RESPONSE FOR CLASS I



## DISCUSSION

The importance of this study rests in the teaching effectiveness measure used. Direct measurement of pupil behavior was used to evaluate teaching effectiveness in both the instructional and student-teaching parts of the adjunct program. The frequency of occurrence measure allowed continuous records to be kept on the pupils. The records of the relevant pupil responses allowed the teacher in each situation to monitor individual learning progress. In addition the records helped the teacher measure the effects of changes in teaching procedures when they were introduced and as long as they remained in effect. Effects of teaching procedures were noted for each pupil by comparing the response rate attained after the change in teaching procedures to the baseline recorded before the change.

Directly measuring pupil behavior change allowed instructional decisions to be based on unambiguous data. The data indicated if the relevant behavior was present and if it was present, at what rate. The teacher could then continue or change teaching procedures according to the information obtained.

Since pupil behavior change is available as a criterion for evaluating teaching effectiveness, there is little need

for teaching effectiveness studies to infer that certain teacher behaviors will affect pupil behavior. The effect of teaching behaviors can be directly demonstrated.

Training programs that adopt the evaluation procedures presented above will be faced with the problem of how to decide what pupil behavior to monitor when trainees are to be evaluated. The following two suggestions could be used. The teacher to be evaluated and the evaluators could agree before the pupils are taught what behaviors are of concern. The behaviors could then be measured during a period of time in which the trainee has control of the classroom. Another approach could start with the measurement of certain pupil behaviors in the cooperating teacher's classroom before the trainee entered it. These pupil behaviors then could be measured during the period in which the trainee has charge.

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